



# PreciseFlex™ DDR 6-Axis & 4-Axis Collaborative Robots

## PreciseFlex™ Collaborative Robotics

### Benefits

- Increases Workforce Productivity and Capacity
- Improves Quality
- Helps Address Labor Shortages
- Works Unguarded 24/7
- Works safely right next to your workforce
- Ease of use enables fast solution implementation
- Saves space and reduces wiring because controls are inside the robot
- Quickly programmed via web interface
- Flexible solutions can be created using the very powerful programming language
- Reduces factory noise by using direct drive motors
- Saves floor space with unique tall cylindrical working volume
- Has very long life because of direct drive motors
- Low power design enables longer use for mobile robot applications

### The Next Generation of Collaborative Robots

The growth of collaborative robots that can safely work side-by-side with people makes automation accessible to a new generation of applications. However, this accessibility has often come at the cost of higher prices for special sensors, reduced repeatability, and dramatically reduced cycle time.

PreciseFlex™ direct-drive collaborative robots provide the features, price and repeatability offered by traditional robots with the ease of use of popular collaborative robots.

These new robots feature direct-drive motors in the base and elbow and a gear belt drive for the Z axis, allowing by hand teaching and eliminating the large collision forces resulting from harmonic-drive robots. This patented design approach allows the robots to move at speeds similar to people, even when people are present in the workcell, while still limiting forces to the ISO collaborative robot standard. Thus, operators can move freely around the robot without concerns for their safety or reducing productivity.

Compared to vertically-articulated robots, the cylindrical working volume of these robots requires a much smaller footprint in the factory. The outer link moves under the inner link, allowing the robot to move from side to side without swinging the tool through a large radius and allowing higher tool speed motions with lower kinetic energy, since the arm is “tucked in”. This further minimizes collision forces. Soft foam covers cushion collisions and protect operators.

These robots have the controls and power supplies located inside the robot. This feature, in addition to the cylindrical working volume, make these robots ideal for mobile applications, as the overhanging moment is much less than a vertically articulated robot, and there is no need to house a large robot controller on the mobile platform.



*PreciseFlex™ DDR 6-Axis*



*PreciseFlex™ DDR 4-Axis*

Product Specifications

|   |                        | PreciseFlex™ DDR 6-Axis  | PreciseFlex™ DDR 4-Axis  |
|---|------------------------|--|--|
| <b>Range of Motion &amp; Resolution</b> | J1 (Base) Axis         | +/- 168 degrees  | +/- 168 degrees  |
|   | J2 (Z) Axis            | 500, 1000, 1420mm  | 500, 1000, 1420mm  |
|   | J3 (Elbow) Axis        | +12 to +348 degrees  | +12 to +348 degrees  |
|   | J4 Axis                | +100, -220 degrees   | +/- 240 degrees  |
|   | J5 Axis                | +/- 110 degrees  |  |
|   | J6 Axis                | +/- 295 degrees  |  |
|   | Repeatability          | 20 microns at center of tool flange  | 20 microns at center of tool flange  |
| <b>Performance and Payload</b>          | Maximum Acceleration   | 5000 mm/sec <sup>2</sup> with 6kg payload  | 5000 mm/sec <sup>2</sup> with 6kg payload  |
|   | Cycle Time             | 1.25 sec for 25 mm x 300 mm x 25 mm cycle with 5kg   | 1.25 sec for 25 mm x 300 mm x 25 mm cycle with 5kg   |
|   | Maximum Payload        | 6kg  | 8kg  |
|   | Collaborative Forces   | PreciseFlex™ collaborative robots have been tested for collision forces and the user manual contains a table of collision forces in free space and against rigid surfaces, using a spring plate that simulates the compliance of the human hand. Maximum speed collisions in free space are under the ISO force limits for operator safety. However, in order to use a robot in an application without safety shields, the application as a whole (including end effectors, operation methods, objects being handled and obstacles in the workcell) must be evaluated for safety. For more information on the evaluation of applications and workcells without safety shields, please contact Brooks Automation. |  |
| <b>Interfaces</b>                       | General Communications | RS-232 channel, 100 Mbps Ethernet port   |  |
|   | Digital I/O Channels   | 12 optically isolated inputs and 8 optically isolated outputs, 24 volts 100ma, available on facilities panel at base. Remote I/O also available.   | 12 optically isolated inputs and 8 optically isolated outputs, 24 volts 100ma, available on front panel of controller. Remote I/O also available.                    |
|   | Pneumatic Lines        | Two air lines, 71 PSI maximum, provided at outer link and routed internally to fittings on the Facilities Panel.   | Two air lines, 71 PSI maximum, provided at outer link and routed internally to fittings on the Facilities Panel.   |
|   | Operator Interface     | Web based operator interface supports local or remote control via browser connected to embedded web server   |  |
|   | Programming Interface  | Three methods available: GPL, TCP/IP Command Server, GuidanceMotion (a web-based drag-and-drop interface for simple applications).   |  |
| <b>Required Power</b>                   |                        | Dual range: 90 to 132 VAC and 180 to 264 VAC, auto selecting, 50-60 Hz, 600 watts maximum, 250 watts typical operation, 80 watts stationary 6kg, 20 watts Z brake on.  | Dual range: 90 to 132 VAC and 180 to 264 VAC, auto selecting, 50-60 Hz, 600 watts maximum, 250 watts typical operation, 80 watts stationary 6kg, 20 watts Z brake on |
| <b>Weight</b>                           |                        | 46, 55, 65kg   | 44, 53, 63kg   |

For more information, please contact your local Brooks Automation sales representative or visit [www.brooks.com](http://www.brooks.com).

